IN THE CLAIMS:

Please amend the claims as follows. The claims are in the format required by 35 C.F.R. § 1.121.

1. (Previously presented) A method comprising:
receiving signals corresponding to a first parameter;
performing an inversion of the received signals, including regularizing the inversion by a Duncan-Horn formulation of a Kalman filter, to generate a mapping of a second parameter; and
providing the mapping to a user.

2. (Original) The method of claim 1, wherein the first parameter comprises electrocardial potentials at a distance from a surface of a heart, and wherein the second parameter comprises electrocardial potentials at the surface of the heart.

3. (Original) The method of claim 2, wherein the first parameter electrocardial potentials are measured at positions within a chamber of the heart.

4. (Original) The method of claim 2, wherein the first parameter electrocardial potentials are measured at positions external to the heart.

5. (Original) The method of claim 2, wherein the first parameter electrocardial potentials are measured simultaneously by a multi-electrode probe.

6. (Original) The method of claim 5, wherein the first parameter electrical potentials are measured simultaneously by regularly spaced electrodes on the multi-electrode probe.

7. (Original) The method of claim 2, wherein the first parameter electrocardial potentials are measured using a multi-sensor probe including elements selected from the group consisting of superconductive quantum interference devices, magnetometers and electrometer amplifier based sensors.

8. (Original) The method of claim 1, wherein the Duncan-Horn formulation of the Kalman filter is based upon multiple steps in time.

9. (Original) The method of claim 8, wherein the Duncan-Horn formulation of the Kalman filter is based upon a selectable number of steps in time.

10. (Canceled)

11. (Original) A system comprising:

a data processor;

a data input interface coupled to the data processor; and

a data output interface coupled to the data processor;

wherein the processor is configured to

receive input data corresponding to a first parameter from the data input interface,

perform regularization using a Duncan-Horn formulation of a Kalman filter in generating output data corresponding to a second parameter, and

provide the output data to the data output interface.

12. (Previously presented) The system of claim 11, wherein the first parameter comprises electrocardial potentials at a distance from a surface of a heart, and wherein the second parameter comprises electrocardial potentials at the surface of the heart, and wherein the data processor is configured to generate a mapping of the electrocardial potentials at the surface of the heart.

13. (Previously presented) The system of claim 12, further comprising a multi-electrode probe coupled to the data input interface and configured to measure the first parameter electrocardial potentials.

14. (Previously presented) The system of claim 13, wherein the multi-electrode probe is configured to measure the first parameter electrocardial potentials at positions within a chamber of the heart.

15. (Previously presented) The system of claim 13, wherein the multi-electrode probe is configured to measure the first parameter electrocardial potentials at positions external to the heart.

16. (Previously presented) The system of claim 13, wherein the multi-electrode probe includes a plurality of regularly spaced electrodes.

17. (Previously presented) The system of claim 12, further comprising a multi-sensor probe which includes elements selected from the group consisting of superconductive quantum interference devices, magnetometers and electrometer amplifier based sensors.

18. (Previously presented) The system of claim 11, wherein the processor is configured to regularize the generation of the output data, wherein the Duncan-Horn formulation of the Kalman filter is based upon multiple steps in time.

19. (Previously presented) The system of claim 18, wherein the processor is configured to regularize the generation of the output data, wherein the Duncan-Horn formulation of the Kalman filter is based upon a selectable number of steps in time.

20. (Canceled)

21. (Currently amended) The method of claim 1, wherein providing the mapping to a user comprises displaying a graphical image display of the mapping to the user.

22. (Previously presented) The system of claim 11, wherein the data output interface comprises a graphical display, and wherein the processor is configured to provide the output data as a graphical mapping of the second parameter.